

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

A Screw Threaded Element having means for Preventing its Accidental Removal from an appropriately Screw Threaded Body

We, NATIONAL RESEARCH DEVELOPMENT CORPORATION, a British Corporation, established by Statute, of 1, Tilney Street, London, W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a screw threaded element having means for preventing its accidental removal from an appropriately screw-threaded body.

It is often desirable that a screwed element shall be held captive when it is temporarily unscrewed and, for this purpose, such an element is commonly provided with an anchorage chain or flexible cable having one end attached to the element and the other end fixed.

According to the invention, the element is provided with a winder which is mounted for independent rotation about the axis of the element, but which winder is provided with means for restraining its rotation relatively to the element in the direction in which the element would require to be rotated to screw it onto an appropriately screw-threaded body such as a pipe, and a cable one end of which is fixed to the winder. The arrangement is such that when the opposite end of the cable is fixed to the said screw-threaded body or to an anchorage fixed relatively to that body, and the cable is fully wound about the axis of the element by rotation of the winder in the direction in which the element would require to be rotated for unscrewing it from the said body, the cable will oppose unscrewing of the element.

The said restraining means may be such as positively to prevent the unwinding of the cable, in which case it may consist of a ratchet and pawl or other positively engaging one-way clutch.

It is to be understood that the expression "cable" as used herein is intended also to [Price 3s. 6d.]

include any suitable flexible means, for example a cord or chain.

The invention may be applied to a blanking-off device.

Examples of constructions of blanking-off devices embodying the invention, will now be described with reference to the accompanying drawings of which:—

Fig. 1 is a part sectional view of one embodiment of the invention

Fig. 2 is a fragmentary view showing certain details

Fig. 3 is a part sectional view showing an alternative construction

Fig. 4 is a part sectional view showing an alternative detail of construction.

In the construction shown in Fig. 1, 1 indicates a blanking-off cap, the forward part of which is interiorly screw-threaded to screw onto the exterior of a common type of gas cock outlet 2 having the usual outwardly tapered bore and a hexagonal shaped part 3, for being engaged by a spanner, the exterior of the cap 1 also being in part hexagonal for this same purpose, as shown in Fig. 2. The outer end portion 4 of the bore of the said outlet 2 is conical, and axially disposed within the cap 1 is a cylindrical plug 5 having at one end a portion 6 which is shaped to enter the bore portion 4 of the outlet 2 and close it, after the manner of a valve, when the cap is screwed on. Coaxial with the screw-threaded portion of the cap 1 is a recess to receive the rear portion of the plug 5. Formed integrally with the plug 5 and extending from the rear end thereof is a coaxial stem 7 which passes through a clearance hole in an end wall of the cap 1. Carried upon the stem 7 are two washers 8 and 9, arranged face to face, the outer washer 9 being provided with equidistantly spaced slots 10, as shown in Fig. 2, and the washer 8 having tongues 11 protruding therefrom which tongues are inclined to form ratchet-like teeth which will engage with the slots 10. The

Price 25s

Price 4s 6d.

5 washer 8 has brazed or otherwise applied to its peripheral portion, at diametrically opposite points, pins 12, 12, each of which extends at a right angle from this washer and engages in a perforation 13 in the outer face of the end-wall of the cap 1 and thus prevents the said washer 8, from rotating independently of the cap. Formed at the outer end of the stem 7 is a portion 14 of reduced diameter, which is riveted to the centre of a cup 15 between 10 which and the outer washer 9 is disposed a helical spring 16, which spring is in partial compression so as to press this washer onto the washer 8. The tongues 11 of the washer 8 are 15 so inclined that, if the washer 9 is held against rotation in a manner to be hereinafter explained, these tongues will so engage the slots 10 of the washer 9 as to prevent the cap 1 from being unscrewed.

20 Formed integral with the washer 9 are lugs 17 by which it may be held or turned and one of these lugs is perforated to carry the end of an anchorage cable 18, the opposite end of which is fixed in any suitable manner (not shown) to the cock. The cap 1 with the plug 25 5, washers 8 and 9, cup 15 and spring 16 will thus be held captive to the cock, as a single unit, upon the cable 18, when the cap is unscrewed from the cock. The tongues 11 are so inclined that any rotative force applied 30 to the cap 1 in a direction to unscrew it from the cock will cause these tongues to lock into the slots 10 of the washer 9, but so that said tongues will ride out of these slots should the washer 9 be turned in the same direction relatively 35 to the washer 8, in order that when the cap 1 has been screwed onto the cock, the washer 9 can be turned, in the unscrewing direction relatively to the cap until the anchorage cable 18 is taut, the cable coiling itself 40 around the cap. Any further movement in the unscrewing direction of either the anchorage washer 9 or the cap is accordingly prevented by the anchorage cable. The cap 1 can, however, 45 be screwed up for further tightening at any time, an advantage which is not afforded by the ordinary known method of locking by locking wires.

50 The spring 16 provides sufficient force to hold the washers 8 and 9 tightly together, but so that they can be axially separated by finger pressure. To permit the cap 1 to be removed, the outer washer 9 is moved against the spring pressure to disengage its slots 10 55 from the tongues 11 of the washer 8, and the anchorage cable 18 is then uncoiled by turning the anchorage washer 9 in the screwing up direction. The cap can then be freely unscrewed and removed, when it will be held captive by 60 being suspended on the cable.

Instead of the washer 9 being provided with slots 10, it may be provided with the tongues, in which case, the washer 8 would be provided with slots instead of tongues.

65 In the construction shown in Fig. 3, the

washer 8 is dispensed with and pegs 19 are carried in perforations 20 drilled in the outer face of the end wall of the cap 1, and the washer 9 is provided with indentations 21 arranged to engage with the rounded outer ends 70 of the pegs 19, so that, in this case the said rounded outer ends can ride out of these indentations, but in so doing, will provide a restraining force. In this construction, the spring 16 is carried between two rings 22, 23, which 75 are of U-shaped cross-section, the outer ring 23 being held upon the stem 7 by a split pin 24, to receive which pin the said stem is appropriately perforated.

80 Instead of the cap 1 being provided with pegs as just described, it may have formed in it a series of depressions such as 25, and the washer 9 may have riveted to it one or more studs 26 having rounded ends adapted to engage with these depressions 25, as shown in 85 Fig. 4.

It will be understood that various modifications are possible within the scope of the claims for example if the cap 1 should be 90 made of steel or other suitable metal it could have slots milled or cut radially in the outer face of its end wall for engagement by tongues of a spring loaded washer.

WHAT WE CLAIM IS:—

95 1. A screw-threaded element having means for preventing its accidental removal from an appropriately screw-threaded body, which means comprises a winder which is mounted for independent rotation about the axis of the said 100 element, but which winder is provided with means for restraining its rotation relatively to the element in the direction in which the element would require to be rotated in order to screw it onto a screw-threaded body such as 105 a pipe, and a cable, one end of which is fixed to the winder, so that when the other end of this cable is fixed to the said screw-threaded body or to an anchorage fixed relatively to that body, and the cable is fully wound about the axis of the element by rotation of the 110 winder in the direction in which the element would require to be rotated for unscrewing it from the said body, the cable will oppose unscrewing of the element.

115 2. A screw-threaded element as claimed in Claim 1, which is provided with a ratchet and pawl or other positively engaging one-way clutch for locking the said winder against rotation in a direction to prevent the cable unwinding. 120

3. Blanking-off devices, substantially as described with reference to Figures 1 and 2 of the accompanying drawings.

4. A blanking-off device, substantially as described with reference either to Figure 3 or 125 to Figure 4 of the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in means for Locking and Retaining
Screw-Threaded Elements

We, NATIONAL RESEARCH DEVELOPMENT CORPORATION, a British Corporation established by Statute, of 1, Tilney Street, London, W.1, do hereby declare this invention to be described in the following statement:—

It is often desirable that a screwed element shall be held captive when it is temporarily unscrewed and, for this purpose, such an element is commonly provided with an anchorage chain or flexible cable having one end attached to the element and the other end fixed. It is also usually necessary or desirable that the element, when screwed up, shall be locked to reduce risk of it becoming unscrewed. A common example of such an element is a blanking cap for screwing on to and closing up a fluid inlet or outlet when the latter is not in use. Often it is difficult to provide a lock nut and moreover, some more positive form of locking may be required. It is usual to provide the element and some nearby fixed part with holes through which can be passed locking wires after the element has been screwed up.

The object of the present invention is to provide a simpler and more satisfactory locking device. Broadly, the invention consists in using the anchorage chain or cable also to serve for locking. More particularly, according to the invention, an anchorage member fastened to the anchorage chain or cable is on the screwed element and disengageably held in relationship with the main part of the element so that before or after the element has been screwed up, the anchorage member can be turned freely in the unscrewing direction until the anchorage cable or chain is taut and will prevent any further unscrewing movement.

In one particular construction according to the invention, a tubular blanking cap, internally screw threaded at one end and either knurled or formed as a hexagon or other nut externally, encloses a cylindrical plug which can enter a nozzle and close it up after the fashion of a valve when the cap is screwed on to the exterior of the nozzle. The cap face, at the opposite end from the screw threaded interior part, has a hole for a stem extending from the internal valve plug. Slidably and rotatably carried on this stem are two washers, face to face. One of these washers is pierced by a ring of equally spaced radial slots. The other is slit radially at one or more positions to correspond exactly to the slots and the slit portion is bent slightly outwardly towards the other washer to form a tongue (which may be springy) which can engage the slots after the fashion of a pawl or detent. Thus there may be one or a number of such tongues spaced around the second washer. One of these washers bears against the cap face and is held against rotation relatively

thereto, for example by carrying pegs which enter holes in the cap face, and thus belongs to the main part of the blanking cap assembly. The other washer, which is disengageable, forms the anchorage member by having a lug which is secured to one end of the anchorage chain or flexible cable. Axial pressure holding the two washers in engagement (but permitting disengagement) is provided by a coiled spring disposed around the stem and held in place by a cup which may be either riveted on to the end of the stem, or retained thereon by a split pin, the spring bearing against one of the washers either directly or with the interposition of a spring-locating cup washer. This spring also retains the internal plug and the washers in position on the blanking cap assembly.

The direction of the tongue or tongues is such that when the anchorage washer is held stationary, the edge of a tongue will engage a slot in a manner to hold the other washer and the blanking cap against turning in the direction to unscrew the cap. When the cap is being screwed on, the anchorage washer, either before or after the cap is screwed up, can however be turned in the unscrewing direction relatively to the cap until the anchorage cable is taut, the cable coiling itself around the cap. Any further movement in the unscrewing direction of either the anchorage washer or the rest of the cap is accordingly prevented by the anchorage cable. The cap can, however, be screwed up for further tightening at any time, an advantage which is not given by the ordinary known method of locking by locking wires.

The spring provides sufficient force to hold the washers tightly together, but such that they can be axially separated by finger pressure. To remove the cap, the outer washer is moved against the spring pressure to free it from the other and the anchorage cable is then uncoiled by turning the anchorage washer in the screwing up direction. The cap can then be freely unscrewed and removed when it will be held captive by hanging suspended on the anchorage cable.

It will be understood that various modifications are possible. Thus a peg could be inserted in a drilled hole or in each of a ring of drilled holes in the cap face and the anchorage washer provided with a co-operating ring or part spherical or preferably substantially conical indentations, the end of each peg projecting and being domed or preferably chamfered to fit the indentations.

The washers or washers and pegs would be of steel to withstand wear although the cap will usually be of softer metal and for lightness

- will often be of aluminium or aluminium alloy. A steel cap could perhaps have slots milled or cut radially in the cap face for engagement by one or more tongues on the anchorage washer. 5 washer from the pegs, against the spring pressure, but with the tongue construction there may be a ratchet action permitting tightening. 10
- 5 It will generally be necessary when tightening up the cable to disengage the indented

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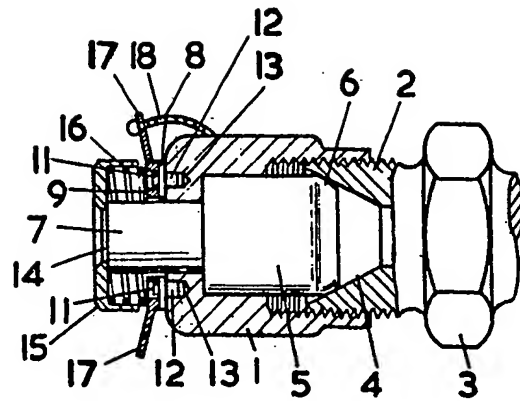


FIG. 1.

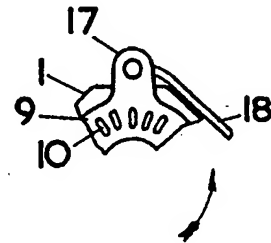


FIG. 2.

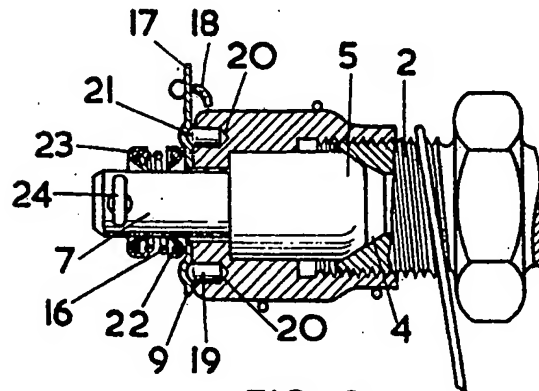


FIG. 3.

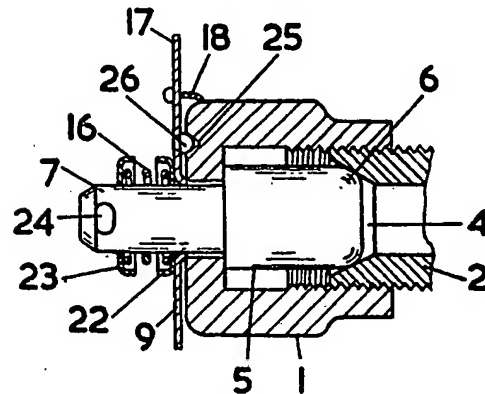


FIG. 4.